

**COMPOSITION AND ECOLOGICAL SIGNIFICANCE OF SHRUBLANDS/GRASSLANDS
IMMEDIATELY WEST OF HELENA REGIONAL AIRPORT**

report to:

Don L. Brown
1050 Broadway, Helena, MT 59601

prepared by:

Robert L. DeVelice, Ph.D.
Montana Natural Heritage Program
1515 E. 6th Ave., Helena, MT 59620

August 24, 1992



Native grasslands and shrublands in the Helena Valley have been largely lost or severely impacted by urban and agricultural development. Remnant sites of native vegetation do still occur at scattered locations within the valley. These sites are important reservoirs of natural biological diversity worthy of consideration for protection before all are lost or irreversibly degraded.

At the request of Don L. Brown (a Helena Regional Airport Boardmember) I conducted a three-hour survey of about 40 acres of native shrublands/grasslands due W of Helena Regional Airport on August 19, 1992 (Figure 1). The site is located on Airport property and is bounded on the W by Interstate 15, on the S by Airport Road, on the E by Washington Street, and on the N by an imaginary line extending W from Skyway Drive to Interstate 15 (T10N, R3W, Sec. 20, NE 1/4). The heavily degraded area with Salix fragilis (crack willow) trees at the S end of the site was not sampled.

The predominant native vegetation type of the study area is the Artemisia cana/Agropyron dasystachyum Type (silver sagebrush/thickspike wheatgrass; similar to the Artemisia cana/Agropyron smithii Type described by Jorgenson 1979 and Hansen 1985). This type is moderately common in swales, drainage bottoms, terraces, and floodplains in the northern Great Plains of Wyoming and Montana. However, high quality occurrences of the type are rare in Montana and most occurrences are in the eastern half of the state. Thus, this airport site is of some botanical interest since it features a uncommon vegetation type for western Montana.

Unfortunately the vegetation condition is not pristine. Weedy exotic (non-native) plants are common to abundant (Table 1), human-derived litter is common, and surface disturbance by machines (e.g., ORV's, bulldozers) is present. Among the most common exotic species present are Agropyron cristatum (crested wheatgrass; abundant in many areas of the site); Bromus inermis, B. japonicus, and B. tectorum (smooth brome, Japanese brome, and cheatgrass, respectively); and Poa pratensis (Kentucky bluegrass; common in moister locations). Of 48 species observed on the site, 11 (23%) are exotic species.

Physiographically, the site is likely representative of much of the wide bottom of the Helena Valley. Slopes in this alluvial basin landform range from flat to 5% and elevations vary from 3840 to 3880 feet. Soils are derived from mixed alluvial sediments and are classified as Borollie Calciorhids and/or Aridic Calciborolls. Soils textures range from loams to silt loams and feature moderate accumulations of organic matter near the surface and significant calcium carbonate accumulation and gravel contents in their subsurface layers.

A 1/10 acre temporary sample plot was established within an area appearing representative of both the Artemisia cana/Agropyron dasystachyum vegetation type and the general physiographic conditions at the site. This plot (number 92RD061; see Figure 1) was also positioned in one of the least weedy locations of the site. The species found on this plot and estimates of the canopy coverage values (a measure of their abundance) are presented in Table 2.

Although the airport site is not pristine (given the common occurrence of exotic species, vehicle tracking, and human-derived litter), the site has definite value as a example (albeit degraded) of what was likely once a more widespread vegetation type in the Helena Valley.

It appears unlikely that the site will ever be used as a building site, since it lies on the immediate approach to the airport runway. However, the condition of the vegetation present is under significant threat by a continued increase in exotic species cover, soil/vegetation disturbance due to vehicle activity, and littering. The site is potentially also under threat for degradation associated with commercial/industrial development of the private land immediately to the N. Development of this land to the N would likely result in enhanced weed encroachment on the study site, more vehicular disturbance, and more garbage deposition.

It is certainly worth considering excluding ORV's and other machines from the site and perhaps installing an interpretive sign at the edge of the site. This sign could describe the site as an example of a (likely) once widespread Helena Valley vegetation type.

Consideration might also be given to an exotic species control program. Along this line, I would like to suggest that those planning to revegetate the area at the S end of the site consider planting native species rather than exotics.

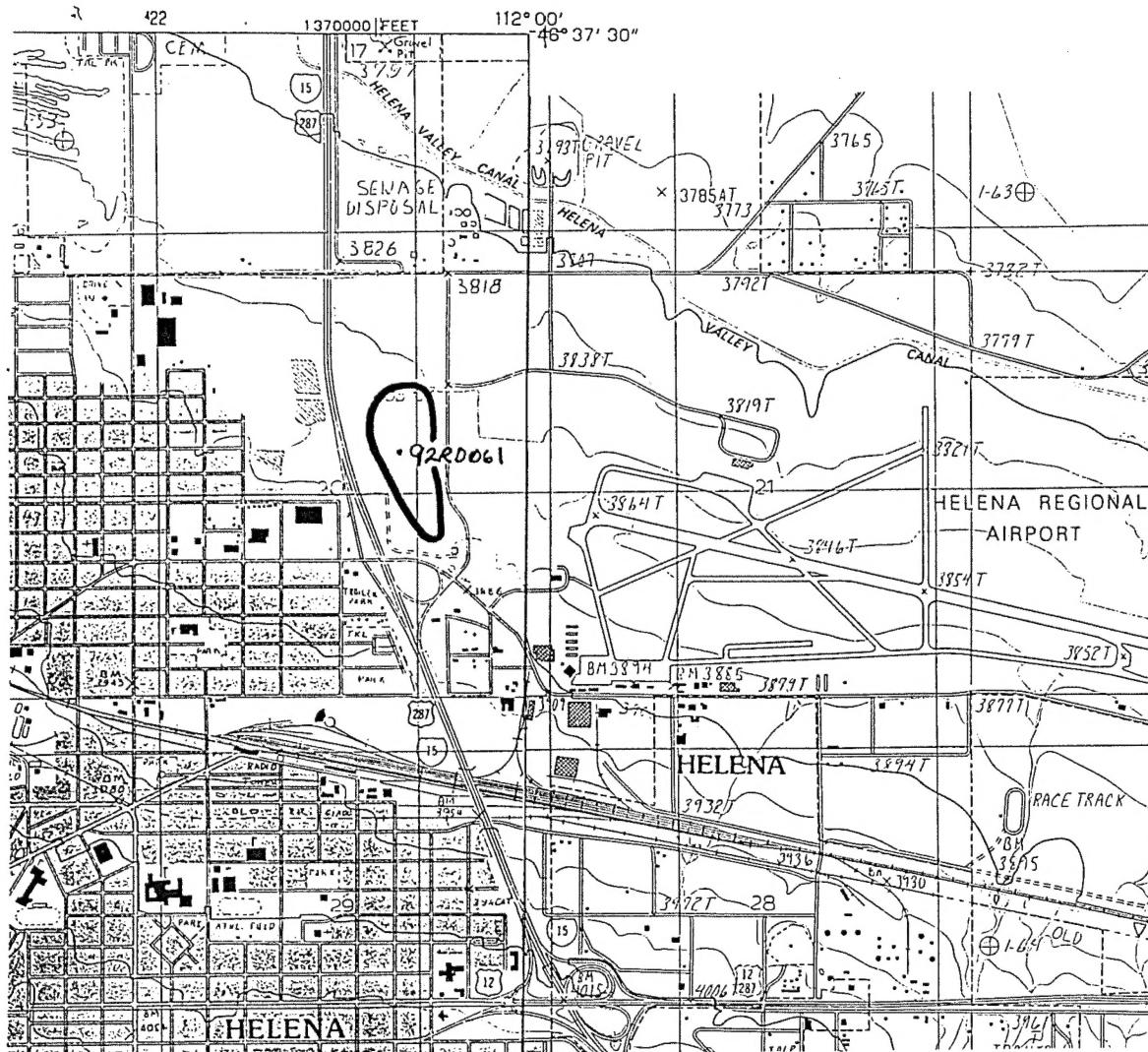


Figure 1. Study site and plot 92RD061 in relation to the city of Helena and the Helena Regional Airport (map scale: 2.25" = 1 mile). The thick black line delimits the boundary of the area surveyed in this study.

Table 1. Vascular plant species observed at the Helena Regional Airport study site. E = exotic species (i.e., non-native, introduced species). Nomenclature follows Hitchcock and Cronquist (1973).

Asteraceae (daisy family)

- Achillea millefolium (Western yarrow)
- Artemisia cana (silver sagebrush)
- Artemisia dracunculus (green sagewort)
- Artemisia frigida (fringed sagewort)
- Artemisia ludoviciana (cudweed sagewort)
- Aster falcatus (creeping white prairie aster)
- Chrysopsis villosa (hairy goldenaster)
- Chrysothamnus nauseosus (rubber rabbitbrush)
- Grindelia squarrosa (curlycup gumweed)
- Gutierrezia sarothrae (broom snakeweed)
- Hymenoxys acaulis (stemless hymenoxys)
- Iva axillaris (poverty sumpfweed)
- Liatris punctata (blazing star)
- Lygodesmia juncea (rush skeletonweed)
- E Tragopogon pratensis (meadow salsify)

Brassicaceae (mustard family)

- E Alyssum desertorum (alyssum)
- Arabis holboellii (Holboell rockcress)
- E Sisymbrium loeselii (small tumblemustard)

Cactaceae (cactus family)

- Coryphantha missouriensis (yellow pincushion cactus)
- Opuntia polyacantha (plains pricklypear)

Capparaceae (caper family)

- Cleome serrulata (Rocky Mountain beeplant)

Chenopodiaceae (goosefoot family)

- Atriplex nuttallii (Nuttall saltbush)
- Eurotia lanata (winterfat)
- E Kochia scoparia (Belvedere summercypress)

Cyperaceae (sedge family)

- Carex stenophylla (needleleaf sedge)

Table 1. (continued)

Fabaceae (bean family)

E *Astragalus* spp. (milkvetch)
E *Melilotus officinalis* (yellow sweetclover)
 Glycyrrhiza lepidota (American licorice)

Liliaceae (lily family)

E *Asparagus officinalis* (asparagus)

Malvaceae (mallow family)

Sphaeralcea coccinea (scarlet globemallow)

Poaceae (grass family)

E *Agropyron cristatum* (crested wheatgrass)
 Agropyron dasystachyum (thickspike wheatgrass)
 Agropyron smithii (Western wheatgrass)
 Agropyron spicatum (bluebunch wheatgrass)
 Bouteloua gracilis (blue grama grass)
E *Bromus inermis* (smooth brome)
E *Bromus japonicus* (Japanese brome)
E *Bromus tectorum* (cheatgrass)
 Koeleria cristata (Junegrass)
E *Poa pratensis* (Kentucky bluegrass)
 Poa sandbergii (Sandberg bluegrass)
 Sitanion hystrich (bottlebrush squirreltail)
 Sporobolus airoides (alkali sacaton)
 Sporobolus cryptandrus (sand dropseed)
 Stipa comata (needle-and-thread grass)
 Stipa viridula (green needlegrass)

Polemoniaceae (phlox family)

Phlox hoodii (Hoods phlox)

Roseaceae (rose family)

Rosa woodsii (Woods rose)

Table 2. Vascular plant species (and their canopy cover values) and ground cover characteristics observed at plot 92RD061. E = exotic species (i.e., non-native, introduced species). Nomenclature follows Hitchcock and Cronquist (1973).

Ground Cover

Soil	30%
Gravel	trace
Rock	0%
Litter	20%
Wood	1%
Moss	0%
Basal Area	30%
Lichens	20%
TOTAL	101%

Shrubs

Shrubs	cc
Artemisia cana	30
Artemisia frigida	20
Chrysothamnus nauseosus	10
Eurotia lanata	3
Gutierrezia sarothrae	20

Grasses & Sedges

Agropyron dasystachyum	30
Bouteloua gracilis	40
Carex stenophylla	3
Koeleria cristata	trace
Poa sandbergii	10
Stipa comata	30
Stipa viridula	trace

Forbs

Arabis holboellii	trace
Aster falcatus	trace
Astragalus spp.	trace
Iva axillaris	trace
Phlox hoodii	1
Sphaeralcea coccinea	trace
E Tragopogon pratensis	trace

Cacti

Coryphantha missouriensis	trace
Opuntia polyacantha	1

LITERATURE CITED

Hansen, P.L. 1985. An ecological study of the vegetation of the Grand River/Cedar River, Sioux, and Ashland districts of the Custer National Forest. Ph.D. dissertation, South Dakota State University, Brookings, SD. 257 pp.

Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. 730 pp.

Jorgenson, H.E. 1979. Vegetation of the Yellow Water Triangle, Montana. Wildlife Division, Montana Department of Fish and Game, Helena, MT. 57 pp.

SITE SURVEY FORM

MTNHP

5/27/91

IDENTIFICATION AND LOCATION

SITENAME Helna Airport

MANUAL STATE 916
MT

MO DAY YEAR EXAMINERS
3 hour survey 8 - 19 - 92 R.L. Develice

COUNTY: LEW QUADNAME: Helena QUADCODE: 4611251

10NT/ 3WR/ 20 _____ SECTION(s)
T/ R/ _____ SECTION(s)

SECTION(S)
DIRECTIONS --> The site is located on Helena Regional Airport property. It is bounded on the W by I-15, on the S by Airport Road, on the E by Washington Street, and on the N by an imaginary line extending W from Skyway Drive to I-15.

ELEMENT OCCURRENCES

Date: 8/19/92

Element Name	Occ. No.	Plot No.	Found?	Found?	Found?
ARTCAN/AGR DAS (syn. ARCA/AGSM)		92RD061	yes		

REVISIT NEEDS--> none.

SITE DESCRIPTION/DESIGN

SITE DESCRIPTION--> The site is a valley bottom location within the broad (>10 miles wide) Helena Valley. Slopes are mostly flat to 5% and elevations vary from 3840 to 3880 feet. Soils are Borollic Calcorthids and/or Aridic Calciborolls. The vegetation is remnant shrubland/grassland within a matrix of highway and airport development. The predominant community type is ARTCAN/AGR/DAS. Exotic species are common to abundant. This is not a

TOPOGRAPHIC BASE MAP: pristis site.

yes no 1. element locations and/or boundaries?
 yes no 2. both primary and secondary boundaries?

BOUNDARY JUSTIFICATION--> The W, S, and E boundaries are all logically defined by road corridors. The N boundary is artificially defined by a property line. The same basic vegetation type extends N of this line to Canyon Ferry Road.

PROTECTION URGENCY

- U1 immediate threat
- (U2) threat w/i 5 yrs
- U3 threat but not w/i 5 yrs
- U4 no threats
- U5 land protected

MANAGEMENT URGENCY

- M1 needed this year
- (M2) needed w/i 5 yrs (or loss)
- M3 needed w/i 5 yrs (or degrade)
- M4 may be needed in future
- M5 none needed

PU COMMENTS:

The site is threatened by commercial/industrial development of the private land immediately to the N, and by continued surface disturbance (e.g., bulldozers, etc...) and exotic expansion on the site itself.

MU COMMENTS:

exotic species will likely increase unless disturbance control measures are instituted.

STEWARDSHIP

ORV's,

LAND USE COMMENTS--> The site has been protected from the building construction since it lies in the immediate approach area to the Helena Airport runway. However, the well represented status of weedy exotics suggests heavy past disturbance by livestock and heavy present disturbance by machines.

POTENTIAL HAZARDS--> Airplane crash landings.

EXOTIC FLORA/FAUNA COMMENTS--> Agropyron cristatum is abundant in many locations on the site. Exotic bromes are common.

OFF-SITE CONSIDERATIONS--> Development of the property to the immediate N could pose a threat of extended weed encroachment on this site and more vehicular disturbance and garbage deposition.

SITE AND ELEMENT MANAGEMENT NEEDS--> Exclude ORV's and other machines and perhaps install an interpretive sign indicating this site as an example (degraded) of once widespread Helena Valley vegetation. Control exotic species, if possible.

SKETCH MAP (e.g., show: (1) EO locations, (2) study plots, (3) natural landmarks, (4) disturbance features, such as structures, trails, logging areas, etc... Include cross section if possible. Include scale and indicate north.)

see base topo. map

COMMUNITY SURVEY FORM

MTNHP
5/27/91

GENERAL PLOT DATA

IDENTIFICATION AND LOCATION

PLOT NO. 92RD061 MO 8 DAY 19 MANUAL 91B UNITS ✓ ft m
 EXAMINER(s) R.L. DeVetice YEAR 92 EOCODE *
 PNC ARTCAN / AGRDAS (Syn. ARCA/AGSMCT)
 SITE Helena Airport STATE MT COUNTY LEWIS
 PURP T PREC S QUADNAME Helena QUADCODE 4611251
10N T/3W R/20 S/ NE 4S/SW 4/4 COMMUNITY SIZE (acres) ca. 80
 PLOT TYPES SCR PLTRL 35.8' PLOT W D SURVEY APL
 PHOTOS 1 - across plot
 DIRECTIONS --> The plot is located .31 miles SW of the intersection of Washington Street and Skyway Drive at the Helena Regional Airport.

CONSERVATION RANKING

COND C Com: Many weedy invader plants are well represented
 VIAB C Com: Site is "protected" from building development since it is
 DEFN A Com: on the immediate approach to the airport runway.
 RANK C Com: However, weedy exotics are abundant in the surrounding veg.
 MGMT: attempt to control the further increase of exotics, e.g., AGRICRI Brojaq.
 PROT: Site has some value as a degraded example of once widespread

ENVIRONMENTAL FEATURES

DL S SOIL RPT — Helena Valley vegetation
 SOIL UNIT — SOIL TAXON Borolliz Calcicard or Aridic Calciboroll
 PM MIAL LANDFORM ACAB PLOT POS WVTU SLP SHAPE S ASP 330°
 SLOPE % 3 ELEVATION 3860 EROS POTENT UP EROS TYPE SE
 HORIZON ANGLE (%): N 3 E 3 S 9 W 5 IFSLP - IFVAL >10 miles
 SPFE site is remnant shrubland/grassland within a matrix of heavy development
 GROUND COVER: 30% S+ T+ G+ 0% R+ 20% L+ 1% W+ 0% M+ 30% BV+ 20% O = 100%
 DISTURBANCE HISTORY (type, intensity, frequency, season) --> lichens limestone

Site was likely heavily grazed prior to airport development etc... in the area. Horse dung and human-derived litter are present.

RIPARIAN FEATURES: Channel Width — Channel Entrench —
 Surface Water — Ht. Abv. H2O — Dist. from H2O —

GENERAL SITE DESCRIPTION (landscape features and adjacent ct's)

I15 lies due W of plot and the Helena airport is due E. Surrounding vegetation is this type and degraded versions of the type (e.g., with Agropyron cristatum well represented).

ROGRA cover decreases on the flatter (0% slope) sites to the North.

OCULAR PLANT SPECIES DATA

PltIDL ①

PLOT NO. 92RD061 NO. SPECIES 216 PNC ARTCAN/AGRDX (syn. ARCA/HGSM)

TREES	Tot Cv	<u>Ø</u>	Mht		CC
Tal Cv			Med Cv		
Low Cv			Grd Cv		
T 1					
T 2					
T 3					
T 4					
T 5					

FRBS	Tot Cv	<u>3</u>	Mht	<u><5</u>	CC
Med Cv			Low Cv		
Grd Cv					
F 1					
F 2					
F 3					
F 4					
F 5					
F 6					
F 7					
F 8					
F 9					
F10					
F11					
F12					
F13					
F14					
F15					

SHRBS	Tot Cv	<u>6Ø</u>	Mht	<u>2'</u>	CC
Tal Cv			Med Cv		
Low Cv			Grd Cv		
S 1					
S 2					
S 3					
S 4					
S 5					
S 6					
S 7					
S 8					
S 9					
S10					
S11					
S12					

F 1					
F 2					
F 3					
F 4					
F 5					
F 6					
F 7					
F 8					
F 9					
F10					
F11					
F12					
F13					
F14					
F15					

GRAM	Tot Cv	<u>8Ø</u>	Mht	<u>.75'</u>	CC
Med Cv			Low Cv		
Grd Cv					
G 1					
G 2					
G 3					
G 4					
G 5					
G 6					
G 7					
G 8					
G 9					
G10					
G11					
G12					

FERN Tot Cv Ø Mht _____ Med Cv _____
 Low Cv _____ Grd Cv _____
 BRYO/LICH Tot Cv 20

COMMENTS (EODATA) --> among the least weedy locations
 within this generally weedy site.

RECONNAISSANCE SOIL CHARACTERIZATION FORM

MTNHP 5/27/91

IDENTIFICATION

(texture codes revised 5/15/92)

PLOT NO. 92 RDx01 MO 8 DAY 19 YEAR 92 EST SOIL DEPTH V Deep
EXAMINER(s) R.L. Belliveau
SOIL SUBGROUP Borollic Calcorthid or Aridic Calciboroll

SOIL DESCRIPTION

HORZ 1	<u>A</u>	DEPTH (cm)	<u>0</u>	to	<u>6</u>	TEXTURE	<u>L</u>
STRUC	<u>Wk</u>	COLOR	<u>10YR 3/2</u>	FRAGS	<u>None</u>	EFFER	<u>Strong</u>
NOTES							
HORZ 2	<u>B</u>	DEPTH (cm)	<u>6</u>	to	<u>12</u>	TEXTURE	<u>L</u>
STRUC	<u>mod</u>	COLOR	<u>10YR 4/2</u>	FRAGS	<u>None +</u>	EFFER	<u>Viol</u>
NOTES							
HORZ 3	<u>Cica</u>	DEPTH (cm)	<u>12</u>	to	<u>22</u>	TEXTURE	<u>SL</u>
STRUC	<u>wk</u>	COLOR	<u>10YR 5/3</u>	FRAGS	<u>grav</u>	EFFER	<u>Viol +</u>
NOTES							
HORZ 4	<u>C2ca</u>	DEPTH (cm)	<u>22</u>	to	<u>35+</u>	TEXTURE	<u>Sil</u>
STRUC	<u>wk</u>	COLOR	<u>10YR 6/3</u>	FRAGS	<u>grav</u>	EFFER	<u>Viol +</u>
NOTES							
HORZ 5		DEPTH (cm)		to		TEXTURE	
STRUC		COLOR		FRAGS		EFFER	
NOTES							

INSTRUCTIONS

- The purpose of this form is to provide rapid, general characterization of the top 50 cm of the soil profile that can be used to identify the soil subgroup and provide information on a few biologically significant soil properties.
- PLOT NO. - same as on Community Survey Form.
- EST SOIL DEPTH - enter the appropriate estimated depth class to bedrock from the list below:

vshall = very shallow; < 10 inches deep (< .25 m)
shall = shallow; 10 - 20 inches deep (.25-.5 m)
moddeep = moderately deep; 20 - 30 inches deep (.5-.75 m)
deep = deep 30 - 60 inches deep (.75-1.5 m)
vdeep = very deep > 60 inches deep (> 1.5 m)
- HORZ - enter the appropriate horizon symbol (e.g., A1, B2t, C1ca). If unknown, enter a "-".

- TEXTURE - enter the appropriate textural code from the list below (identification of broad class is required, i.e., first two characters of code; identification of basic class is optional):

<u>General</u>	<u>Broad Class</u>	<u>Code</u>	<u>Basic Class</u>
sandy	coarse	COS	sand
		COLS	loamy sand
loamy	moderately coarse	MCSL	sandy loam
	medium	MEvfSL	very f. sandy loam
		MEL	loam
		MESiL	silt loam
		MESI	silt
	moderately fine	MFCL	clay loam
		MFSCL	sandy clay loam
		MFSiCL	silty clay loam
clayey	fine	FISC	sandy clay
		FISiC	silty clay
		FIC	clay

- STRUC - enter the appropriate structural grade code from the list below:

none = structureless (single grain or massive)

weak = indistinct peds

mod = moderate structure

str = strong (horizon entirely of distinct peds)

- COLOR - enter the hue, value, and chroma of the moist soil sample used to identify texture, e.g., 10YR 3/2.

- FRAGS - enter the appropriate coarse fragment content code from the list below:

none = none to few (<20% volume in >2 mm diameter fragments)

grav = gravelly (20-50% volume in 2 mm-3 inch dia. frags.)

vgrav = very gravelly (50-90% volume in 2 mm-3 inch frags.)

cob = cobbly (20-50% volume in 3-10 inch dia. frags.)

vcob = very cobbly (50-90% volume in 3-10 inch dia. frags.)

ston = stony (20-50% volume in >10 inch dia. frags.)

vston = very stony (50-90% volume in >10 inch dia. frags.)

- EFFER - enter one of the following classes to denote the degree of soil effervescence in response to 10% HCl:

- = no information

NO = none

SL = slight

ST = strong

VI = violent

